Engineering Specification Report

Plant Design Document Analysis

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ENGINEERING SPECIFICATION ANALYSIS

Focus Area: Entire Document

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- Purpose and Scope of Documents
  - Governs tank nozzle load evaluation and requirements for shell■mounted nozzle design, including mandatory use of API 650 Appendix P allowed external loads at nozzle■to■shell junction (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf", citing 10080-1-SS-ME-004, Appendix P).
  - Applies to vendor deliverables during Manufacturing & site erection: "Nozzle load Analysis" is a required submission item (From 10080-1-SS-ME-004, Vendor Data Requirements 12.2.viii) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").
  - Specifies contractor responsibility to confirm acceptability of specified external nozzle and support pad loading or advise maximum acceptable loading for tank design (From 10080-1-SS-ME-004, Appendix P, P.1.1) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").
  - References requirements that anchor chairs and anchor bolt locations be positioned to clear nozzles and manways (relevance to nozzle load/reinforcement layout) (From Addition 5.12.6) (From "testttttttt.pdf").
  - Requires tank data sheet (OWNER) to provide specific tank configuration, service data and applicable loads (document states OWNER will provide these on the tank data sheet) (From "testttttttt.pdf", Section 3 Inputs and Additional Requirements).
- Applicable Codes, Standards, and References
  - API 650 (general) is cited as the primary tank design code to be followed (From

10080-1-SS-ME-004) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• API 650 Appendix P (mandatory for Allowable External Loads on Tank Shell Openings) (From 10080-1-SS-ME-004, Appendix P) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• IS 875 (Part 3) Wind design standard with parameters specified (From BEDD EPCMD-1-DBD-GE-001, section 5.2.2 addition) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• IS 1893 Seismic design standard referenced; tanks Appendix E requires IS 1893 / IITK■GSDMA guidance (From BEDD and 10080-1-SS-ME-004 Appendix E) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• ANSI B16.47 Series B type flange requirement for nozzles above 24" NB (except manways) (From Addition 5.7.6.1.a) (From "testttttttt.pdf").

• Software accepted for piping/nozzle analysis: CAESAR, NOZZLEPRO, CAEPIPE (From BEDD EPCMD-1-DBD-GE-001, section 5.2 software list) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Design and Performance Requirements

• Use API 650 Appendix P nozzle allowable external loads at the nozzle■to■shell junction as minimum requirements for shell■mounted nozzle design (From 10080-1-SS-ME-004, Appendix P) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle loads ≤2" NB are considered negligible per document note (From 10080-1-SS-ME-004, Appendix P table note) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Loads for nozzles >24" NB to be agreed between CONTRACTOR and CONSTRUCTION MANAGER (From 10080-1-SS-ME-004, Appendix P) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle flanges above 24" NB (except manways) shall be per ANSI B16.47 Series B type (From Addition 5.7.6.1.a) (From "testttttttt.pdf").

• CONTRACTOR must provide calculations justifying acceptability of specified external nozzle and support pad loading (From 10080-1-SS-ME-004, Appendix P) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Anchor chairs and anchor bolt locations to be positioned to clear nozzles and manways (From Addition 5.12.6) (From "testttttttt.pdf").

• Material and Component Specifications

• Nozzle flanges above 24" NB (except manways) to conform to ANSI B16.47 Series B type (From Addition 5.7.6.1.a) (From "testttttttt.pdf").

• No other explicit material grades, lining, insulation types, thicknesses, coatings, valve or fitting specifications are provided in the documents (From entire provided files) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf" and "testttttttt.pdf").

• Loads, Allowables, and Design Data

• Nozzle allowable loads at nozzle■to■shell junction (API 650 Appendix P table): Nozzle size 3"

— Radial load = 1000 N; Circumferential moment = 200 Nm; Longitudinal moment = 200 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 4" — Radial load = 1500 N; Circumferential moment = 300 Nm; Longitudinal moment = 300 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 6" — Radial load = 2500 N; Circumferential moment = 700 Nm; Longitudinal moment = 700 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 8" — Radial load = 4000 N; Circumferential moment = 1500 Nm; Longitudinal moment = 1500 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 10" — Radial load = 5000 N; Circumferential moment = 2500 Nm; Longitudinal moment = 2500 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "testttttttt.pdf" and "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 12" — Radial load = 7000 N; Circumferential moment = 4000 Nm; Longitudinal moment = 4000 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 14" — Radial load = 9000 N; Circumferential moment = 6000 Nm; Longitudinal moment = 6000 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "10080-1-DBD-GE-001 Basic Engineering Design Data Rev 2 (1)_Specs.pdf").

• Nozzle size 16" — Radial load = 11000 N; Circumferential moment = 8000 Nm; Longitudinal moment = 8000 Nm (From 10080-1-SS-ME-004, Appendix P table) (From "testttttttt.pdf").

• Nozzle size 18" — Radial load = 13000 N; Circumferential

End of Report